SHORTER PIT STOPS FOR EXPENSIVE TECH
Software-defined storage reduces downtimes for a road assessment vehicle

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"The Open-E storage system is constantly saving IMP Bautest money as it allows our special vehicle to return to the road for our customers much quicker thanks to faster data transmissions."

Alexander Ernst,
IT Director IMP Bautest

The I.R.I.S. Assessment vehicle collects up to 48 terabytes of data in operation. The storage solution from Thomas-Krenn enables faster data transfers from the vehicle to IMP Bautest's IT systems.

Swiss IMP Bautest AG, based in Oberbuchsiten near Solothurn, is a private institute for material testing, construction consulting and analytics. The company was founded in 1989 and has 70 employees at several locations in Switzerland and Germany. One field of business that is becoming increasingly important for IMP Bautest involves road assessments on behalf of local authorities or developers. The company developed the mobile data acquisition system I.R.I.S especially for this purpose: It consists of a minibus packed with high-resolution cameras, a 360-degree laser and other laser-based measuring devices. The system can collect data while moving at high speeds (up to 120 km/h), taking regular photos of the road surface and using lasers to capture the immediate surroundings with an extremely high level of detail. The data is used to create 3D models of the entire road network. Such models are needed for the maintenance and planning of traffic routes. In the summer of 2018, for instance, I.R.I.S. was tasked with assessing roads in Germany as part of a pilot project on behalf of Deutsche Telekom for the expansion of its fiber-optic network.

The challenge

As the installation and maintenance of such a vehicle is costly, it is in the interest of the company to reduce downtime and to keep the vehicle on the road as much as possible. The most significant source of downtime was downloading the collected data. Approximately 36 GB is generated per kilometer. The vehicle can store up to 48 TB before it has to return to the "pit" in Oberbuchsiten. With the old storage solution, downloading the data could take several days as the existing storage solution with Synology systems proved to be a bottleneck.

Another point that required a faster storage solution was the post-processing of images and videos. Because the data collected is not only stored but also tagged with detailed geo-information and processed in other

ways, the system needed to be able to make the large image and video files quickly accessible for editing and saving.

In addition to the pure bandwidth during transmission, this work also required optimized IOPS values and latencies in order to enable rapid processing. Moreover, the new storage system should not only meet the current requirements for all parameters but should also be scalable so that it can be used for a long time – even with increasing capacities and performance requirements. IT Director Alexander Ernst shortlisted several providers: This included systems from Dell/EMC, Netapp, a Nimble system from HPE and two concepts from Thomas-Krenn – one using SUSE Enterprise Storage and a second using JovianDSS from Open-E, a provider of Linux-based software-defined storage solutions. The final choice came down to the Nimble system and the Open-E solution.

Solution

In the end, the decision was made in favor of Open-E – not only because of the better price-performance ratio at the time of purchase but also because of the high consulting expertise of Thomas-Krenn's sales staff. Alexander Ernst was already impressed by their proficiency during the bidding phase: "It is very unusual that sales personnel have such a high level of technical understanding for our requirements. Monika Burkhardt and Michael Essig were extremely impressive in this respect."

On the software side, Open-E's JovianDSS proved to be the optimal solution because it is highly flexible in terms of both hardware compatibility and storage connectivity to virtual environments. JovianDSS is based on Linux and ZFS – an infinitely scalable, mature distributed file system. IMP Bautest can therefore expand the system as required with inexpensive standard hard drives or SSDs. The software's transparent licensing structure according to terabyte further helps to keep the costs calculable.

The hardware of the implemented solution is based on the Open-E certified system from Thomas-Krenn but offers a higher quality network connection and CPU to meet the increased IOPS requirements. It consists of a highly available system with two nodes accessing a shared storage area. This consists of 60 HDDs with a total capacity of 240 terabytes in a JBOD, supplemented by 1.6 TB SSDs for caching. A total of six 10 GbE NICs per node ensure high throughput. As with all software-defined storage solutions, performance depends not only on network bandwidth but also heavily on CPU and RAM. The nodes are therefore equipped with fast 3.6 GHz Xeon CPUs and 512 GB of RAM.

The storage system is connected to a virtual machine running VMware vSphere via several iSCSI paths as a block device. Veeam is used to back up the data to an Overland Neo Tape Library. The commissioning, initial tests and transfer to productive operation took a total of two days. An Open-E-certified technical consultant was also present on site for one day. "During commissioning, it became quite clear that an Open-E system could be installed very quickly and connected to the existing servers. Nevertheless, we were not completely satisfied at the beginning," notes Alexander Ernst. "Performance initially lagged behind the expected values. But together with the Thomas-Krenn technicians, the problem with the connection to the hypervisor was quickly identified and the promised throughput achieved."

Summary

As a result, IMP Bautest now saves time in two key areas. Transferring the data collected by I.R.I.S. now takes less than a third of the time previously required. This allows the system to be on the road for several hundred more hours per year on behalf of customers. For this reason alone, the project will pay for itself in just a few months. The processing of the raw data also runs much more smoothly now and the workload for the specialists involved has been notably reduced. There is still room for improvement, however. "The old storage system was at its limit during data transmission, but the new one is far from being fully utilized. We are now looking to speed up the transmission rates of the I.R.I.S. vehicle and expect to halve downtime once more."

THOMAS KRENN®

The assessment produces three-dimensional 360-degree images of the entire road space. These are the basis for digital terrain models.